Claims

We claim:

1. A method for facilitating trick plays, the method comprising the steps of:

receiving a media stream that comprises independently decoded frames and inter-frames; and

analyzing the media stream and in response generating a media stream associated data structure that enables a transmission of a trick play media stream.

2. The method of claim 1 wherein the media stream is MPEG compliant.

3. The method of claim 2 wherein the independently decoded frames are I-frames.

4. The method of claim 1 wherein the step of analyzing comprises locating I-frames, storing the location of the I-frames and retrieving timing information associated with the I-frames.

5. The method of claim 4 wherein the timing information comprises normal play time values.

6. The method of claim 1 wherein the media stream associated data structure comprises retrieval information for facilitating retrieval and transmission of the independently decoded frames.

7. The method of claim 1 wherein the media stream associated data structure comprises retrieval information for facilitating retrieval and transmission of the independently decoded frames and of duplicating frames.

8. A method for providing trick mode streams, the method comprising the steps of:

(a) receiving a request to change a display mode of a certain media stream;

(b) fetching a media stream associated data structure associated with the certain media stream; and

(c) processing the media stream associated data structure and in response providing a media stream that complies with the requested display mode.

9. The method of claim 8 wherein the step (c) comprises:

determining a number of duplicating frames between each pair of independently decoded frames of a trick play media stream in response to the requested display mode; and fetching independently decoded frames from locations that are pointed to in the media stream associated data structure.

10. The method of claim 9 further comprising altering timing information of independently decodable frames and of duplicating frames to provide a sequence of frames that form a media stream of a requested mode.

11. The method of claim 8 wherein the display mode is fast forward or rewind.

12. The method of claim 8 wherein the display mode is pause or slow motion.

13. The method of claim 8 wherein the display mode defines a presentation rate of the media stream.

14. The method of claim 8 wherein the step of fetching comprises a step of determining whether the media stream associated data structure is stored at a local storage medium or is stored in a remote server.

15. The method of claim 8 wherein a change between display modes comprises switching between media streams at predefined points having essentially the same normal play time values.

16. The method of claim 8 further comprising multiplexing the media stream with other media streams to provide a multiplex of media streams to end users.

17. The method of claim 16 further comprising associating with each media stream of the multiplex a unique PID such that each media stream is distinguishable from other media streams of the multiplex.

18. A computer readable medium having code embodied therein for causing an electronic device to perform the steps of:

(a) receiving a request to change a display mode of a certain media stream;

(b) fetching a media stream associated data structure associated with the certain media stream; and

(c) processing the media stream associated data structure and in response providing a media stream that complies with the requested display mode.

19. The computer readable medium of claim 18 wherein the step (c) comprises:

determining a number of duplicating frames between each pair of independently decoded frames of a trick play media stream in response to the requested display mode and end-user characteristics; and

fetching independently decoded frames from locations that are pointed to in the media stream associated data structure.

20. The computer readable medium of claim 19 wherein the steps further comprise altering timing information of independently decodable frames and of duplicating frames to provide a sequence of frames that form a media stream of a requested mode.

21. The computer readable medium of claim 18 wherein the display mode is fast forward or rewind.

22. The computer readable medium of claim 18 wherein the display mode is pause or slow motion.

23. The computer readable medium of claim 18 wherein the display mode defines a presentation rate of the media stream.

24. An apparatus for facilitating trick plays, the apparatus comprising a video pump adapted to access media stream associated data structures and selectively fetch portions of stored media streams, in response to contents of the media stream associated data structures, and to provide a trick play media stream.

25. The apparatus of claim 24 wherein an entity is configured to receive a media stream that comprises independently decoded frames and inter-frames and to analyze the media stream and in response generate the media stream associated data structure that enables transmission of the trick play media stream; wherein the entity comprises the apparatus or a server coupled to the apparatus.

26. The apparatus of claim 25 wherein the media stream is MPEG compliant.

27. The apparatus of claim 26 wherein the independently decoded frames are I-frames.

28. The apparatus of claim 25 wherein the entity is operative to analyze the media stream by locating I-frames, storing the location of the I-frames and retrieving timing information associated with the I-frames.

29. The apparatus of claim 28 wherein the timing information comprises normal play time values.

30. The apparatus of claim 25 wherein the media stream associated data structure comprises retrieval information for facilitating retrieval and transmission of the independently decoded frames.

31. The apparatus of claim 25 wherein the media stream associated data structure comprises retrieval information for facilitating retrieval and transmission of the independently decoded frames and of duplicating frames.

32. An apparatus for providing trick mode streams, comprising:

means for receiving a request to change a display mode of a certain media stream;

means for fetching a media stream associated data structure associated with the certain media stream; and

means for processing the media stream associated data structure and in response providing a media stream that complies with the requested display mode.

33. The apparatus of claim 32 wherein the means for processing comprises: means for determining a number of duplicating frames between each pair of independently decoded frames of a trick play media stream in response to the requested display mode and end-user characteristics; and means for fetching independently decoded frames from locations that are pointed to in the media stream associated data structure.

34. The apparatus of claim 33 further comprising means for altering timing information of independently decodable frames and of duplicating frames to provide a sequence of frames that form a media stream of a requested mode.

35. The apparatus of claim 32 wherein the display mode is fast forward or rewind.

36. The apparatus of claim 32 wherein the display mode is pause or slow motion.

37. The apparatus of claim 32 wherein the display mode defines a presentation rate of the media stream.

38. The apparatus of claim 32 wherein the means for fetching comprises means for determining whether the media stream associated data structure is stored at a local storage medium or is stored in a remote server.

39. The apparatus of claim 32 wherein the apparatus is operable to change between display modes by switching between media streams at predefined points having essentially the same normal play time values.

40. The apparatus of claim 32 wherein the apparatus is further operable to multiplex the media stream with other media streams to provide a multiplex of media streams to end-users.

41. The apparatus of claim 40 wherein the apparatus is further operable to associate with each media stream of the multiplex a unique PID such that each media stream is distinguishable from other media streams of the multiplex.